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FOUR NEW SUBSPECIES OF THE GENUS *CICINDELA* (COLEOPTERA, CICINDELIDAE)

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The large amount of cicindelid material at the American Museum of Natural History, much of it of recent collection, has revealed many geographical subspecies not before recognized. The description of a few of these at this time was undertaken at the suggestion of Dr. Mont A. Cazier in order to facilitate his monograph on the Cicindelidae of the United States, now in progress.

Cicindela californica viridicyanea, new subspecies

Labrum with front margin feebly tridentate, the median tooth more prominent and acute; antennal scape with a single long white hair at apex only; gena without hair; front of head without hair; thorax with a few scattered, white, reclining hairs on sides, base, and apex; elytra, male, nearly parallel to apical fifth, then narrowing obliquely to the conjointly rounded, but somewhat truncate apex, each elytron with small acute spine at suture; female same as male except apices of elytra separately rounded, the sutural angle retracted, the spine less acute. Elytral markings connected along margins, basal lunule scarcely defined, middle band well defined, short, narrow, oblique, stopping before reaching the suture, with its apex sometimes rounded, sometimes truncate. Color above and below bright green or blue.

TYPE LOCALITY: Wilcox, [Cochise County], Arizona, holotype male, Wilcox, Arizona, September 1, 1947 (F. H. Parker), allotype female, Wilcox, Arizona, August 18, 1949 (F. H. Parker), and 52 paratopotypes. Holotype and allotype and 34 para-

topotypes in the American Museum of Natural History; other paratopotypes in the collections of F. H. Parker and C. de W. Funaro.

DISTRIBUTION: Wilcox, Arizona.

Differs from the other subspecies in the bright green metallic color above and in the lack of coppery or red reflections on the sides of the thorax below. Differs further from *praetextata* (Arizona, New Mexico, Texas) by having the middle band of the elytra shorter and less oblique, or narrower; from *mojavi* (southern California) in that the markings are separated, not confluent; from *californica* (Lower California) in that the markings are connected along the margins.

DISCUSSION: The elytra in 14 of the 54 specimens is bright blue, almost purple, in 29 it is bright green, in nine a duller, darker green, and in two it lacks the metallic reflections and is more or less brown, as in *mojavi*, but these two have the thorax below characteristically green. The thorax above is usually the same color as the elytra, sometimes a different shade.

This subspecies is quite isolated from its nearest neighbors (allopatric), and no intermediates have been seen.

Some of the specimens (Parker) were collected "on the sand banks of a pond" in the Sulphur Spring Valley area near Wilcox at 4156 feet. There is probably alkali here, as Parker mentions patches of a "coarse, wiry alkali-tolerant grass" that grows on the banks.

***Cicindela scutellaris flavoviridis*, new subspecies**

Labrum with front margin in female prominently and suddenly tridentate, in male not so suddenly or strongly tridentate; antennal scape with a dozen or more long white hairs at base, middle, and apex; gena without hair; front of head, female, with three white hairs each side of middle on level of front angle of eyes, male with numerous white hairs; thorax with very sparse long white hairs at sides, the inner row erect; elytra, male and female, short, broad, gradually widening towards apical fifth where they are conjointly rounded to apex, without any spine. Elytral markings none; elytral color yellow green.

TYPE LOCALITY: Forestburg, [Montague County], Texas, holotype male, allotype female, March, 1928 (Calder collection), and 47 paratopotypes. Holotype and allotype and 23 paratopotypes in the American Museum of Natural History; the others

in the collections of the University of Michigan, South Dakota State College, and J. H. Robinson.

DISTRIBUTION: North central Texas, south of the Red River from Montague County to Brown County and east to Tarrant County.

Differs from *rugifrons* (northeastern states) and its black phase (*modesta*) in the immaculate elytra, more rugose thorax, less rugose front of head, and lack of any black phase; from *unicolor* (southeastern states) and its black phase (*nigrior*) in the more rugose thorax, less rugose front of head, lack of black phase, and light yellow green color; from *lecontei* (central eastern states and eastern Canada) and *criddlei* (northern North Dakota and Canada) in the immaculate elytra and green color; from *scutellaris* (central states, western Canada, and northern Texas) in the green color; from *rugata* (Louisiana, eastern Texas) in light yellow green color.

DISCUSSION: For comparison of *flavoviridis* with *rugata*, see discussion under that subspecies. *C. s. flavoviridis* is intermediate between *rugata* to the east and *scutellaris* to the north, but is more closely related to the latter. Both *flavoviridis* and *scutellaris* have yellow or coppery reflections on the elytra, even though *flavoviridis* has the elytra predominantly light green and *scutellaris* has them predominantly red with some green at the base. Of 65 specimens of *scutellaris* only five have more green than red on the elytra; of these five, one is probably wrongly labeled (Fort Garland, Colorado, June, Osler, Calder collection), and one has white markings at the apex; the other three (two from Alva, Wyoming, one from "Ks.") are indistinguishable from the yellowest of the *flavoviridis* specimens.

A population of *C. s. scutellaris* has been seen from Cooke County, Texas, just south of the Red River which is very near the northernmost range of *flavoviridis*. At Denton County, just south of Cooke County, an intermediate specimen has been taken which is not quite so red as *scutellaris*, but more red than any *flavoviridis*.

***Cicindela scutellaris rugata*, new subspecies**

Similar to *C. s. flavoviridis*, but differs from that subspecies by being purplish or blue green, not yellow green.

TYPE LOCALITY: Vowell's Mill, Natchitoches County, Louisiana, holotype male, allotype female, and nine paratopotypes, in

the collection of the American Museum of Natural History. Twenty-three paratypes from: Texas: Atlanta, May 7, 1949 (J. H. Robinson), 20; Anderson County, March 26, 1938 (J. H. Robinson), one; Grimes County, May 13, 1936 (J. H. Robinson), one; Kaufman County, June 2, 1934 (J. H. Robinson), one. Seven paratypes in the American Museum of Natural History; the others in the collection of J. H. Robinson.

DISTRIBUTION: Western Louisiana and eastern Texas as far southwest as Bexar County and northwest to Kaufman County.

Differs from *rugifrons* (northeastern states) and its black phase (*modesta*) in the immaculate elytra, more rugose thorax, less rugose front of head, and lack of any black phase; from *unicolor* (southeastern states) and its black phase (*nigrrior*) in more rugose thorax, less rugose front of head, lack of black phase; from *lecontei* (central eastern states and eastern Canada) and *criddlei* (northern North Dakota and Canada) in immaculate elytra and green color; from *scutellaris* (central states, western Canada, northern Texas) in green color; from *flavoviridis* (north central Texas) in its purplish or blue green color, not yellow green.

DISCUSSION: This subspecies is intermediate between *unicolor* to the east and *flavoviridis* to the west, having the purple or blue green coloration of *unicolor* and the more rugose thorax and less rugose head of *flavoviridis*.

Though so similar to *unicolor* in coloration, *rugata* can always be told from that race by comparison of the thoracic structure and the rugosity on the front of the head. In *unicolor* the thorax, while not entirely smooth, in that it has a few impressed lines, still is smooth between these lines; in *rugata* the entire thorax is much wrinkled between all the impressed lines, which are numerous. In the case of the front of the head, just behind the clypeus, it is *unicolor* that is more rugose, having the wrinkles deeply cut, and *rugata* that is less rugose, the wrinkles being shallower. (The difference is seen best in the females.)

The thorax and head are similar in rugosity in *rugata* and *flavoviridis*, but here the elytral color differs. *Cicindela s. rugata* has the elytra purple or sometimes dull blue green, whereas *flavoviridis* has them yellow green, sometimes light green. Some few *rugata* approach in color the *flavoviridis* specimens that have the least amount of yellow in the elytra, but it is still a different shade of green, and *rugata* never has any yellow in its coloring. Also the green *rugata* that might be confused with the green

flavoviridis (no yellow in the elytra) tend to have the thorax the same shade of green, while in *flavoviridis* the thorax is a deeper shade, usually mixed with blue.

Intergrades between these two subspecies appear to be present in the populations occurring at Dallas, Dallas County, and at Gatesville, Coryell County, Texas.

***Cicindela lemniscata rufipes*, new subspecies**

Labrum with front margin unidentate and strongly sinuate on either side of the tooth; antennal scape with a single long white hair at apex only; gena without hair; front of head without hair; thorax with reclining white hairs on sides only; elytra, male, almost parallel to apical fifth, then conjointly rounded at apex, slightly truncate, with acute spine at suture. Elytral markings consisting of a longitudinal band from base to apex and touching the margin in those places only. The band usually sinuate before apex in portion where middle band would be expected. Legs metallic red.

TYPE LOCALITY: Van Horn, Culberson County, Texas, holotype male, allotype female, July 10, 1948 (C. and P. Vaurie), and 314 paratopotypes, in the collection of the American Museum of Natural History. One hundred and twenty-nine paratypes from: *New Mexico*: Alamogordo (G. V. Krockow), three; Alamogordo, Otero County, 4300 feet, July 25, 1948 (G. E. Ball), 24; Carlsbad Cavern, Eddy County, August 18, 1935 (T. H. and G. O. Hubbell), one; 5 miles south of Mesilla, Dona Ana County, July 25, 1948 (G. E. Ball), one. *Texas*: Marathon, Brewster County, June 13, 1948 (M. Cazier), one; Glenn Spring, Brewster County, July 24, 1928 (F. M. Gaige), two; Hot Springs, Terlingua Creek, Brewster County, July 6, 1948 (C. and P. Vaurie), three; Boquillas, Brewster County, July 7, 1948 (C. and P. Vaurie), 21; Terlingua, Brewster County, July 3, 1948 (C. and P. Vaurie), one; 15 miles north of Cooper's Store, Brewster County, July 8, 1948 (C. and P. Vaurie), one; Sheffield, Pecos County, June 30, 1948 (C. and P. Vaurie), three; Davis Mountain Junction, Reeves County, July 9, 1948 (C. and P. Vaurie), one. *Mexico*: *Tamaulipas*: Nuevo Laredo (Höge), one; the following specimens taken on David Rockefeller Mexican Expedition: *Chihuahua*: Delicias, 4150 feet, July 11, 1947, eight; 63 miles west of Santa Barbara, 5500 feet, July 20, 1947, nine; Samalayuca, June 24, 1947, seven; 42 miles southwest of Camargo, 4900 feet, one; Valle de Olivos,

5500 feet, July 20, 1947, one; 1 mile east of La Saucedá, 7000 feet, July 21, 1947, one; 10 miles south of Las Delicias, July 13, 1947, one; Santa Barbara, 6300 feet, July 18, 1947, two; 20 miles southwest of Camargo, 4500 feet, July 13, 1947, six. *Durango*: Cuencame, 5500 feet, August 19, 1947, one; San Juan del Rio, 5200 feet, July 30, 1947, six; Pedricena, 4500 feet, August 19, 1947, 11; Nombre de Dios, 5900 feet, August 13, 1947, six. *Coahuila*: Cabos, 4000 feet, August 21, 1947, two; La Gloria, south of Monclova, 3300 feet, August 24, 1947, three; Guadalupe, August 23, 1947, one. All in the collection of the American Museum of Natural History.

DISTRIBUTION: Southern New Mexico, southwestern Texas, including the Rio Grande south to Laredo, and the northern Mexican states of Chihuahua, Tamaulipas, Durango, and Coahuila.

Differs from *lemniscata* in the strongly pigmented metallic red legs.

DISCUSSION: The entire leg is red, or red with green reflections, in *rufipes*, while in *lemniscata* (southern Arizona, northern Mexico west of the Sierra Madre Occidental), though the tarsi are colored as in *rufipes* and the tibiae are occasionally slightly pigmented, the femora are consistently colorless, in fact virtually transparent. In a few specimens from Salome, Arizona (four of 85), and Gila Bend, Arizona, the femora show a tinge of green along the front edge.

Neither subspecies shows any geographic variation in elytral markings, which is unusual; the longitudinal band may be broader or narrower or interrupted near the apex or at the middle, but these differences are scattered throughout the ranges of both subspecies.

Intermediate populations between *lemniscata* and *rufipes* are found in southern New Mexico at Deming, Lordsburg, and Grant County. These have a small amount of green pigment on the front of the otherwise colorless femora.

The type and paratopotypes were collected at night after 9:30 P.M. when they were exceedingly abundant at all the lighted places in the desert town of Van Horn. One specimen was taken by day in a dry creek bed.